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ABSTRACT

Census data were used to predict average district scores on standardized achievement tests for grades one, two, three, six, and twelve, in 716 California school districts. The following census variables were used: education, income, college, poverty (families); poverty (children); professional occupations; housing; Spanish surnames; and Black. Results are reported both as absolute scores (average number answered correctly) and as transformed scores (a standardized score which allows grade level comparisons). Predictions were presented in a series of tables. The first predictions included only a small number of census variables, beginning with a measure of poverty--with more variables added in subsequent formulations. The reason for following this format is to give some idea of the gain in "predictive power" to be had by including additional variables and to allow alternative specifications for simulation. Results indicated that the predictive power of reading test equations, based on average education and median income of district residents, was not improved substantially by adding other educational and income variables--these additional variables did improve the predictive power of the mathematics test equations. Ethnic variables increased the predictive power considerably. In general, there was no advantage to using transformed scores. (The tables, comprising over one half of the document, are appended). (CP)

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PREDICTION OF TEST SCORES: CALIFORNIA

The relationship between school district average test scores and socioeconomic variables in California is explored in this report. As explained in the comparable report pertaining to Massachusetts, the primary goal is to determine how well test scores can be predicted from socioeconomic variables, and to compare "best" possible predictions with those obtained using a simple measure of poverty. The poverty measure may be taken as a proxy for the indicator currently being used to allocate Title I funds. The results are intended to complement those for Massachusetts as well as allow comparison of results for two quite different populations. The California data, however, encompass a broader range of tests than the Massachusetts data.

Census data have been used to predict average district reading test scores for grades one, two, three, six, and twelve and mathematics test scores for grades six and twelve. The results are based on data for 716 districts in California.[1] The predictions are presented in a series of tables at the end of this report. They have been grouped by type of test--reading or mathematics--and by the functional form of the predictor equations. Both the absolute value of the average score (the average number answered correctly) and a transformation of this score were used as dependent variables. Within each group, several specifications are presented. The first specifications include only a small number of independent variables, beginning with a measure of poverty, with more variables added in subsequent formulations. The reason

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* The extensive computer work necessary to produce the calculations in this report was done by Christopher Zook.

1. This represents almost all of the districts with more than 300 students for which Census data was available. A few districts were eliminated because of obviously incorrect data.

for following this format is to give some idea of the gain in "predictive power" to be had by including additional variables and to allow alternative specifications for simulation. The independent variables are intended as indicators of socioeconomic background of students.

The main thrust of the analysis and discussion is toward the prediction of test scores, with a reasonably small number of socioeconomic variables. Therefore, there is a considerable emphasis on the predictive power or R^2 value of the estimated equations. Estimates of particular coefficients have not been given much attention, although some observations have been made on findings of substantive interest. In fact, as the reader will see, some of the specifications include measures of socioeconomic characteristics that are likely to reflect the same underlying attributes of districts. Thus, the interpretation of individual coefficients in a causal sense is not appropriate in most instances.

Interpretation of the results presented in the tables requires some background information, which is presented first. The next section is a short explanation of the test scores and the socioeconomic variables used in the analysis. The following section is a discussion of the absolute score predictions, and the final section an explanation of transformed score specifications. A short summarization of conclusions follows.

The Tests and the Socioeconomic Variables

A listing of the tests used for each of the grades is presented in Table 1 along with some summary statistics. Note that the summary statistics pertain to the average of student scores within each district, not to individual student scores. The last column of the table presents a number which depends both on the mean of the district average scores, and the number of

questions on the test. It is useful in interpreting the coefficients in the transformed equations and will be explained below. The test score data were collected by the California Department of Education.[1] The Department's description of the tests (excluding the grade three reading test for 1970-71) is reproduced in an appendix.

The independent variables used were obtained from the 1970 Census Fourth Count (Population) School District Data Tapes, except where noted. All the data pertain to school districts. The variables and their definitions are:

Education:	Average years of school of persons 25 years old or over,
Income:	Median family income estimated from the distribution of families by income interval, in thousands of dollars,
College:	Proportion of persons 25 years or older with four years or more of college,
Povery (Families):	Proportion of families with incomes below the poverty level as defined by the Social Security Administration Poverty Index,
Poverty (Children):	Proportion of children from families with incomes below the poverty level.
Professional:	Proportion of employed persons 16 years old and over in "professional, technical, and kindred" occupations or classified as "managers and administrators except farm,"
Housing:	The median value of owner occupied housing, in thousands of dollars,[2]
Spanish:	Proportion of students with Spanish surnames,[3]
Black:	Proportion of students who are Negro.[3]

1. They are reproduced in Profiles of School District Performance, California State Testing Program, 1973-74. We obtained the data directly from a tape provided by the Department.

2. Obtained from the Census School District First Count Summary Tape.

3. Obtained from the California Department of Education, Profiles of School District Performance, California State Testing Program, 1973-74.

Correlation matrices and summary statistics pertaining to these variables are presented in Table 6.

A summary key to the tables of results is located at the end of the text (page 14). It indicates in which table to look for parameter estimates based on equation specifications with various independent variables. For example, parameter estimates of equations predicting absolute reading test scores for the sixth grade from average education and income variables can be found in Table 2A.

Prediction of Absolute Scores

Tables 2-2F contain parameter estimates for various reading score prediction specifications. Estimates pertaining to mathematics scores are presented in Tables 3A-B. Recall that the dependent variable is simply the average number of correct responses for students in the district. All of the estimates were obtained by ordinary least squares. Data for three years, 1970-71 through 1972-73, were run together. That is, there are three test scores for each district, giving a total number of observations equal to three times the number of individual districts represented. Estimates for grades one through six are based on data from elementary and unified districts and those for grade twelve on unified and secondary districts.[1] Within these groups, the number of observations varies somewhat depending on the number of districts reporting each test score.

Although it is straightforward to compare predictions for the same grade (test) across specifications, comparisons across grades (tests) for any given specification are somewhat more difficult to make because of the change in tests from one grade to the next. The tests that appear to be the most

1. In general, no distinction is made between types of districts.

comparable are those for grades one through three. All of them contain a total of 50 questions. The test for grade six is also comparable to these, but contains 85 questions. Each of these tests measures both reading vocabulary and comprehension. The grade 12 reading test, however, appears to be somewhat different, in that it tests the student's ability to interpret reading materials in the social sciences. Nonetheless, some general trends will be pointed out.

Predictions of test scores based on poverty alone are presented in Tables 2 and 2'. They measure the correspondence between poverty and academic achievement and, thus, may be thought of as indicators of the correspondence to be expected between an allocation scheme based on poverty (the current one[1]) and one based on average district achievement scores. They serve as a base of comparison for subsequent results. The results in Table 2 are based on poverty families and those in Table 2' on children from poverty families. The two variables give comparable results. The proportion of variation in test scores that is explained by poverty ranges from about .2 in the first grade to .4 in the sixth.

The estimates in Tables 2A and 2B are based on income and education variables only. By comparing the R^2 values in the two tables, it can be seen that adding separate variables indicating the proportion of the population who are very poor and who are college educated adds very little to the explanatory power of the equations.[2] Although R^2 values range from .32 to

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1. The current system in California is based on the number of AFDC children as well as a measure of poverty. The poverty measure we have used, however, should be a reasonable proxy for the measures actually used in the determination of Title I funds.

2. It is difficult to interpret individual coefficients with the specification in Table 2B because the two education variables "overlap," and so

.55 as compared with .2 to .4 when poverty is used alone to predict test scores. Of substantive interest is the general increase in the size of the coefficient on education in predicting test scores through the sixth grade and the concomitant decline in the coefficient on income. Comparison with the twelfth grade predictions is confounded not only by the change in tests but by the fact that many students, especially those who did poorly in earlier years, have dropped out of school by the twelfth grade. (Even for the first six grades, the effect of changes in the tests and the importance of socio-economic variables are likely to be confounded to some extent.)

Table 3C presents estimates with the proportion of employed persons who are professional included as an independent variable with average education and median income. Again we observe that the gain in R^2 is quite small. A loose interpretation of the coefficients for the sixth grade, for example, would indicate that students from "professional" districts score about 11 points higher on the average than students from "non-professional" districts. This represents about 18 percent of the mean score of 59 on the sixth grade reading test. One might compare this with a predicted difference of about 15 points between districts whose average education level differs by four years. Although it is tempting to give a "causal" meaning to this type of comparison, the nature of the variables we have used makes such a comparison unwarranted. The proportion of parents who are professional, for example, could be thought of as simply an additional measure of education. Thus, one does not want to say that the occupational mix of the residents of a district

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do the two income variables. A better specification is to break both income and education into intervals and use the proportion of the population within the intervals as separate variables. The resulting coefficience estimates are readily interpretable and one can get a good idea of the effect of changes in the distribution of education or income, even if the mean value should remain the same. We experimented with this type of specification but without any gain in predictive ability and have not pursued it here.

is more important than the educational mix in determining reading ability or test scores. The value of owner occupied housing has also been used as a measure of district socioeconomic status. Again, little is gained in predictive power, although individual coefficients are sometimes significant. (See Table 2D.)

The most important aspect of the specifications in Tables 2E and 2F is that they contain additional socioeconomic indicators in the form of ethnic variables giving the proportion of the students who are Spanish and those who are Black. We note that the ethnic effects are sizable and, for Blacks, increase rather dramatically between the first and sixth grades.[1] They fall in the twelfth grade, but not relative to mean test scores. The Spanish and Black effects are about 19 percent and 17 percent of the mean district test score in the first grade, respectively, and increase to 22 percent and 38 percent by the sixth grade (Table 2F). They are 22 and 45 percent, respectively, of mean test scores in the twelfth grade. The effects should be interpreted as reflective of the socioeconomic background and surroundings of Spanish and Black students. They are likely to pick up background characteristics of districts that are not captured by measures on income and education alone. Note that these estimated effects remain quite stable under different specification; in particular, when additional variables are added to the equations as reported in Table 2F. We observe also that the R^2 values increase substantially when the ethnic variables are added.

Finally, note that there is only a small increase in the R^2 values between Tables 2E and 2F or 2F'. Adding additional measures of socioeconomic

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1. For each district, we have only one ethnic variable indicating the proportion of students by race. However, the proportion in any particular grade is likely to deviate from the average.

characteristics of districts adds little to the predictive power of the equations, once the education, income, and ethnic variables are included, while confounding the interpretation of individual coefficients other than the ethnic effects. Note again that all of the other variables are likely to be highly colinear as a group (see Table 6), and attempts to isolate separate effects for each are not likely to lead to meaningful interpretations.

Estimates of parameters in the mathematics score prediction equations are presented in Tables 3A and 3B. The series of specifications parallels that for the reading scores, except that there are only two tests--one for the sixth and the other for the twelfth grade. Recall that only secondary and unified districts report twelfth grade scores, so that the number of observations is 1778, versus 961 for the sixth grade test.

Prediction of Transformed Scores

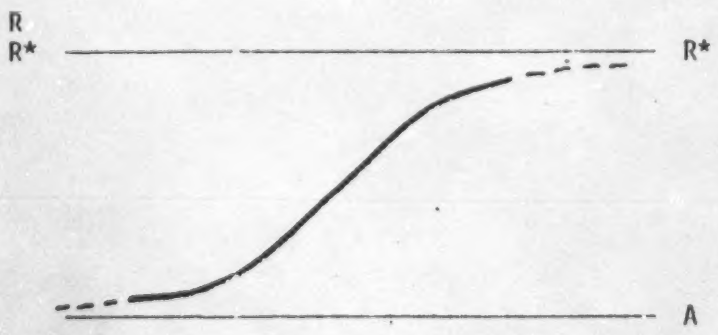
There are two reasons for considering transformed scores. The first is that comparison of coefficients across grade levels (tests) is difficult if the scores are not standardized in some way. The second is that an appropriate transformation could yield specifications with greater predictive power than the linear specification predicting absolute scores. The transformation proposed below is an attempt to satisfy both.[1] It also has the advantage of never predicting scores outside the logical bounds of zero and the number of test questions, although this theoretical advantage is not particularly compelling for the purposes of this study. Since the results contained in Tables 4 and 5 parallel those in Tables 2 and 3, they will not be discussed

1. Although the standardized scores are measured in the same units they are not normalized in the usual statistical sense. That is, no correction is made for different means and standard deviation.

in detail. However, the rationale for the transformation, as well as some comparison for the main features of the two approaches, will be discussed briefly.

The transformation is motivated by the observation that scores on any of the tests are limited by the number of test questions. That is, no individual can do better than answer all the questions correctly. Thus, one might suspect, for example, that as individual reading ability increases, test scores approach the maximum possible scores asymptotically. Once an individual has gotten close to the maximum, there is little room for test score improvement, even if reading ability increases. We might expect this effect to be especially pronounced at higher grade levels, in particular, when similar tests, like those for grades one through six, are compared. Although we would expect the effect to be less strong for average district scores, it may still be present. It may be very difficult to increases average scores above a certain point. The logical bound is still the maximum test score; but marginal increases in average scores may be difficult to attain as scores approach a point well below this bound.

A somewhat more formal argument will lead to the transformation we have used. Let R* be the maximum score (the number of questions) on a test and assume that average reading ability, A, is related to average district scores, R, as in the figure below.



A relationship of this type can be represented by a logistic functional form where,

$$R = \frac{R^*}{1 + e^{-A}} ,$$

and,

$$R^* - R = \frac{R^* e^{-A}}{1 + e^{-A}} .$$

Then,

$$\frac{R}{R^* - R} = e^{A}$$

and,

$$\ell n \ \frac{R}{R^* - R} = A$$

If we let X be a vector of district characteristics (e.g., our socioeconomic variables) and assume that $A = \beta' X + \varepsilon$, where β is a vector of parameters and ε a random term with mean zero, we can express the transformed score as,

$$\ell n \ \frac{R}{R^* - R} = \beta' X + \varepsilon .$$

The estimates in Tables 4 and 5 are analogous to those in Tables 2 and 3 except that the dependent variable, instead of being the absolute score R, is the transformed score $\ell n \ [R/R^*-R]$. Note that we are now considering the ratio of the average number of correct responses to the average number of incorrect ones. This standardization allows reasonable comparison of coefficients across tests. In general, R^2 values do not differ substantially

between the transformed and absolute score specifications.[1] The absolute score specifications generally yield somewhat higher values in the first through fifth grades, and the transformed score specification in the sixth grade. Apparently, over the range of our data, nonlinearities are not important, except possibly with respect to the sixth grade scores. The two specifications yield approximately equal R^2 values for the twelfth grade.

To interpret individual coefficients using the transformed specification it is helpful to consider the implied marginal effect on the absolue score R of a change in a right-hand variable. Although the marginal effect on the transformed score is constant, the implied effect on the absolute score is not; it depends on R and R*. In fact, for any independent variable, X_j, the derivative of R with respect to X_j is given by,

$$\frac{dR}{dX_j} = \frac{R(R^* - R)}{R^*} \cdot \beta_j \quad .^{2/}$$

It is often convenient to evaluate this change in the average test score due to a (unit) change in an independent variable at the mean of the average test scores, $\bar{R}$. Thus, the relevant values are given in the last

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1. Because the left-hand variables are different, we cannot make precise comparison of "fit" on the basis of R^2 values.

2. Given that $\ell n\,[R/(R^*-R)] = \beta_1 X_1 + \beta_2 Y_2 + \ldots + \beta_j X_j + \ldots + \varepsilon$,

$$\frac{d\ \ell n\,[R/(R^*-R)]}{dX_j} = \beta_j \text{ , and}$$

$$\frac{d\ \ell n\,[R/(R^*-R)]}{dX_j} = \frac{(R^*-R)}{R} \cdot \frac{d\,[R/(R^*-R)]}{dX_j} =$$

$$= \frac{dR}{dX_j} \cdot \frac{R^*}{R(R^*-R)} \quad .$$

column of Table 1. For example, the effect of the ethnic group variable, black, on sixth grade reading scores from Table 4D would be,

$$\frac{59.45(85-59.45)}{85} \cdot (-1.237) = 17.87 \cdot (-1.237) = -22.11 .$$

(The comparable estimate based on the absolute score prediction is 22.48.) Evaluated at an absolute score of 75, however, the estimated effect would be only -10.91.

Another possibility is to evaluate dR/dX_j at the mean value, say, of all independent variables, using the formula,

$$\frac{dR}{dX_j} = \frac{R^* e^{-\beta'X}}{(1 + e^{-\beta'X})^2} \cdot \beta_j$$

and substituting the estimated coefficients and the mean of each of the X's for $\beta'X$.

Conclusions

The proportion of variation in reading tests scores explained by our measures of poverty range from about .2 for the first grade to .4 for the sixth. By adding additional socioeconomic variables, these proportions are increased to about .34 and .65 respectively. A quick summarization of the results can be gotten by looking at Tables 2' and 2F' (pages 17 and 25, respectively).

The predictive power, R^2 values, of reading test equations based on average education and median income of district residents is not improved substantially by adding additional (or more refined) measures of education and income. And, the interpretation of individual coefficients is made more

difficult by the addition of these variables. (Compare, for example, Tables 2A and 2B.) These additional variables add substantially, however, to the fit of the mathematics test specifications, especially for the twelfth grade. (See Table 3A.)

Ethnic variables increase considerably the predictive power of the equations. The estimated effect of ethnic background increases with grade level, reaching about 22 percent of the mean twelfth grade reading score for Spanish surnamed students and 45 percent for blacks. (Compare Tables 2A and 2E.) The estimated coefficients reflecting ethnic effects are quite stable across equation specifications.

In general, predictions of test scores based on transformed scores and absolute scores fit the data equally well, although the use of transformed scores seems to give somewhat better results for the sixth grade. Thus, for purposes of simulation there appears to be no advantage to using transformed scores. They do, however, facilitate comparison of coefficients across tests.

Table 1. Tests and Summary Statistics

Grade One Subject	Name of Test	Number of Questions, R^*	Mean of District Averages, $\bar{R}$ [1]	Standard Deviation of District Averages [1]	$\frac{\bar{R}(R^*-\bar{R})}{R^*}$ [2]
Grade One Reading	Cooperative Primary Reading Tests, form 12A	50	24.24	4.91	12.49
Grade Two Reading	Cooperative Primary Reading Tests, form 23A	50	27.59	4.41	12.37
Grade Three Reading: [3]					
1970-71	Standard Reading Test, Primary II, Form X	96	61.54	11.61	22.09
1971-72 and 1972-73	Cooperative Primary Reading Tests, form 23B	50	37.28	3.85	9.48
Grade Six Reading	Comprehensive Tests of Basic Skills, Form Q, Level 2: Reading (Test 1, Reading Vocabulary; and Test 2, Reading Comprehension)	85	59.45	7.38	17.87
Grade Twelve Reading	Iowa Tests of Educational Development, Form X-4: Reading (Test 5, Ability to Interpret Reading Materials in the Social Studies)	53	20.72	2.77	12.62
Grade Six Math	Comprehensive Tests of Basic Skills, Form Q, Level 2: Arithmetic (Test 6, Arithmetic Computation; Test 7, Arithmetic Concepts; and Test 8, Arithmetic Applications)	98	68.09	8.92	20.78
Grade Twelve Math	Iowa Tests of Educational Development, Form X-4: Arithmetic (Test 4, Ability to Do Quantitative Thinking)	33	12.61	1.98	7.79

[1] Applies to the districts used for estimation (not all districts in California), and the years 1970-71 through 1972-73, except where noted.

[2] This value is useful in interpreting the coefficients in the transformed specifications. It will be explained below.

[3] To maintain comparability with the first and second grade reading scores, data for 1971-72 and 1972-73 were used for estimation.

Key to Tables 2-5*

Independent Variables	Test											
	Reading										Mathematics	
	1		2		3		6		12		6	12
	A	T	A	T	A	T	A	T	A	T	A T	A T
Poverty (Families)	2	-	2	-	2	-	2	-	2	-	- -	- -
Poverty (Children)	2'	-	2'	-	2'	-	2'	-	2'	-	- -	- -
Education Income	2A	4A	2A	4A	2A	4A	2A	4A	2A	4A	3A 5A	3A 5A
Education Income College Poverty (Families)	2B	4B	2B	4B	2B	4B	2B	4B	2B	4B	3B 5B	3B 5B
Education Income College Poverty (Children)	2B'	-	2B'	-	2B'	-	2B'	-	2B'	-	- -	- -
Education Income Professional	2C	4C	2C	4C	2C	4C	2C	4C	2C	4C	3C 5C	3C 5C
Education Income Housing	2D	4D	2D	4D	2D	4D	2D	4D	2D	4D	3D 5D	3D 5D
Education Income Spanish Black	2E	4E	2E	4E	2E	4E	2E	4E	2E	4E	3E 5E	3E 5E
Education Income College Poverty (Families) Professional Housing Spanish Black	2F	4F	2F	4F	2F	4F	2F	4F	2F	4F	3F 5F	3F 5F
Education Income College Poverty (Children) Professional Housing Spanish Black	2F'	-	2F'	-	2F'	-	2F'	-	2F'	-	- -	- -

* The numbers in the heading indicate grade, "A" indicates absolute score, and "T" transformed score. The table entries are table numbers.

Table 2. Reading Test Predictions, Absolute Scores, Poor Families

Independent Variables	Dependent Variables				
	1st Grade Reading,	2nd Grade Reading,	3rd Grade Reading,	6th Grade Reading,	12th Grade Reading,
Average Years of Education of Residents					
Median Income of Families					
Proportion of Residents With College Degrees					
Proportion of Families Below Poverty Line	- 35.82300 (1.63100)	- 38.92200 (0.97390)	- 36.48600 (1.40800)	- 73.92000 (2.15100)	- 26.54500 (1.39000)
Proportion Residents in Professional Occupations					
Median Value of Owner Occupied Housing					
Proportion Spanish Students					
Proportion Black Students					
Constant	27.85000 (0.19400)	31.51000 (0.16300)	40.96000 (0.16800)	66.86000 (0.25500)	23.29000 (0.15500)
R^2	.21190	.31090	.35960	.40010	.27570
Sum of Squared Residuals	34170	24000	11360	57960	5328
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 2'. Reading Test Predictions, Absolute Scores, Poor Children

Independent Variables	Dependent Variables				
	1st Grade Reading,	2nd Grade Reading,	3rd Grade Reading,	6th Grade Reading,	12th Grade Reading,
Average Years of Education of Residents					
Median Income of Families					
Proportion of Residents With College Degrees					
Proportion of Children Below Poverty Line	- 25.04100 (1.16800)	- 27.97300 (0.97390)	- 25.97900 (1.00600)	- 52.50700 (1.54300)	- 18.57900 (0.98020)
Proportion Residents in Professional Occupations					
Median Value of Owner Occupied Housing					
Proportion Spanish Students					
Proportion Black Students					
Constant	27.71000 (0.19200)	31.47000 (0.16000)	40.89000 (0.16600)	66.71000 (0.25300)	23.27000 (0.15400)
R^2	.20390	.31570	.35790	.39550	.27270
Sum of Squared Residuals	34520	1788	11390	58410	5350
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

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Table 2A. Reading Test Predictions, Absolute Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading, Absolute Score
Average Years of Education of Residents	1.40510 (0.12080)	1.84720 (0.09860)	1.89630 (0.10580)	4.34580 (0.14890)	1.63940 (0.09010)
Median Income of Families	.38350 (.05300)	.23123 (.04340)	.04190 (.04650)	- .03180 (.06520)	.01098 (.03990)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	4.98400 (0.97700)	5.00000 (0.79700)	16.04000 (0.85500)	11.99000 (1.21000)	2.52400 (0.74400)
R^2	.31300	.43340	.42700	.54540	.45370
Sum of Squared Residuals	29780	19730	10170	43930	4019
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 2B. Reading Test Predictions, Absolute Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading, Absolute Score
Average Years of Education of Residents	.59310 (.21820)	1.17720 (0.17810)	1.52550 (0.19070)	3.74900 (0.27470)	1.22310 (0.17050)
Median Income of Families	.20086 (.06360)	.09330 (.05210)	.02590 (.05560)	- .11980 (.07850)	- .07510 (.04550)
Proportion of Residents With College Degrees	13.72000 (2.66400)	9.99650 (2.17800)	- .81140 (2.33000)	5.41830 (3.32000)	8.70680 (1.96300)
Proportion of Families Below Poverty Line	- 9.93750 (3.24800)	- 9.37390 (2.65200)	- 10.77800 (2.83800)	- 11.27100 (4.07800)	- 2.14240 (2.72100)
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	15.20000 (2.58000)	13.56000 (2.10000)	21.45000 (2.25000)	19.96000 (3.25000)	7.19600 (2.07000)
R^2	.32310	.44040	.43780	.54730	.46760
Sum of Squared Residuals	29350	19490	9976	43740	3917
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Appendix Table 2B'. Reading Test Predictions, Absolute Scores, Poor Children

Independent Variables	Dependent Variables				
	1st Grade Reading,	2nd Grade Reading,	3rd Grade Reading,	6th Grade Reading,	12th Grade Reading
Average Years of Education of Residents	.58476 (.19850)	.94736 (.16120)	1.41040 (0.17280)	3.35060 (0.24740)	1.04800 (0.16560)
Median Income of Families	.18305 (.06380)	.03620 (.05190)	- .01260 (.05550)	- .21080 (.07840)	- .10927 (.04800)
Proportion of Residents With College Degrees	14.24700 (2.60300)	12.63200 (2.11700)	.77990 (2.26600)	9.74590 (3.21900)	10.45200 (1.97600)
Proportion of Children Below Poverty Line	- 7.65620 (2.07400)	- 10.50600 (1.68600)	- 9.87880 (1.80700)	- 14.43700 (2.59000)	- 5.04630 (1.81300)
Proportion Residents in Professional Occupations					
Median Value of Owner Occupied Housing					
Proportion Spanish Students					
Proportion Black Students					
Constant	15.47000 (2.31000)	16.88000 (1.88000)	23.20000 (2.01000)	25.63000 (2.88000)	9.61700 (1.99000)
R^2	.32470	.44850	.44900	.55320	.47000
Sum of Squared Residuals	29280	19210	9850	43170	3899
Number of Observations	1796	1790	1198	1772	960
Years	1970/71-72/73	1970/71-72/73	1971/72-72/73	1970/71-72/73	1970/71-72/73

Table 2C. Reading Test Predictions, Absolute Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading, Absolute Score
Average Years of Education of Residents	1.01400 (0.16320)	1.45520 (0.13310)	1.97080 (0.14350)	3.81700 (0.20100)	1.23810 (0.11630)
Median Income of Families	.30430 (.05740)	.15270 (.04680)	.05690 (.05040)	- .13710 (.07030)	- .07310 (.04240)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	7.83770 (2.20800)	7.84940 (1.80300)	- 1.49220 (1.93900)	10.55900 (2.70700)	8.32390 (1.55700)
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	8.21600 (1.33000)	8.23100 (1.09000)	15.43000 (1.17000)	16.35000 (1.64000)	5.80200 (0.95600)
R^2	.31780	.43930	.42730	.54930	.46950
Sum of Squared Residuals	29570	19530	10160	43550	3903
Number of Observations	1796	1790	1158	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 2D. Reading Test Predictions, Absolute Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading, Absolute Score
Average Years of Education of Residents	1.23200 (0.13150)	1.71550 (0.10730)	1.91350 (0.11560)	4.15170 (0.16260)	1.63380 (0.09740)
Median Income of Families	.22500 (.07160)	.11069 (.05850)	.05770 (.06290)	- .20540 (.08780)	.00480 (.05680)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	.08740 (.02660)	.06650 (.02170)	- .00872 (.02340)	.09650 (.03280)	.00315 (.02070)
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	6.71200 (1.11000)	6.31400 (0.90300)	15.87000 (0.97200)	13.92000 (1.37000)	2.58300 (0.84200)
R^2	.31720	.43630	.42700	.54760	.45370
Sum of Squared Residuals	21600	19630	10170	43710	4019
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 2E. Reading Test Predictions, Absolute Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading Absolute Score
Average Years of Education of Residents	1.02400 (0.16430)	1.32530 (0.13190)	1.13670 (0.13680)	2.94500 (0.18260)	1.36010 (0.11960)
Median Income of Families	.43930 (.05660)	.30120 (.04550)	.14610 (.04710)	.13580 (.06290)	.04680 (.04080)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	- 2.71560 (0.73720)	- 3.74530 (0.63350)	- 5.44180 (0.65600)	- 10.21600 (0.88450)	- 2.11400 (0.60960)
Proportion Black Students	- 3.31820 (1.11600)	- 6.19640 (0.89550)	- 8.36030 (0.93000)	- 21.21500 (1.23900)	- 8.34230 (0.80470)
Constant	9.17500 (1.52000)	10.86000 (1.22000)	24.52000 (1.26000)	28.09000 (1.69000)	5.87000 (1.12000)
R^2	.32060	.45740	.48820	.63080	.51350
Sum of Squared Residuals	29460	18900	9082	35670	3579
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 2F. Reading Test Predictions, Absolute Scores

Independent Variables	Dependent Variables				
	1st Grade Reading, Absolute Score	2nd Grade Reading, Absolute Score	3rd Grade Reading, Absolute Score	6th Grade Reading, Absolute Score	12th Grade Reading, Absolute Score
Average Years of Education of Residents	- .30430 (.27800)	.08330 (.22270)	.51260 (.23330)	1.34000 (0.30920)	.32668 (.20600)
Median Income of Families	.12330 (.07580)	.00945 (.06070)	- .00683 (.06370)	- .33710 (.08340)	- .05690 (.05810)
Proportion of Residents With College Degrees	15.07100 (3.39000)	10.50700 (2.71300)	3.22720 (2.84800)	7.94890 (3.75700)	14.35700 (2.40000)
Proportion of Families Below Poverty Line	- 8.95310 (3.27300)	- 7.55680 (2.61600)	- 8.07370 (2.27470)	- 3.71810 (3.66000)	- 2.23120 (2.54600)
Proportion Residents in Professional Occupations	1.26270 (2.93700)	4.42690 (2.34900)	.77290 (2.24640)	9.20190 (3.22800)	1.20980 (2.08800)
Median Value of Owner Occupied Housing	.08490 (.02860)	.08200 (.02280)	.05660 (.02400)	.18980 (.03140)	.00510 (.02050)
Proportion Spanish Students	- 4.67430 (0.83230)	- 5.43380 (0.66820)	- 5.93990 (0.69980)	- 12.81800 (0.92410)	- 4.41200 (0.66160)
Proportion Black Students	- 4.11880 (1.14200)	- 6.79760 (0.91230)	- 8.10260 (0.95880)	- 22.47900 (1.25300)	- 9.34980 (0.79410)
Constant	24.49000 (3.07000)	24.61000 (2.46000)	32.11000 (2.58000)	44.42000 (3.43000)	16.89000 (2.34000)
R^2	.34020	.47730	.49450	.64940	.55210
Sum of Squared Residuals	28610	18200	8969	33880	3295
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Appendix Table 2F'. Reading Test Predictions, Absolute Scores, Poor Children

Independent Variables	Dependent Variables				
	1st Grade Reading,	2nd Grade Reading,	3rd Grade Reading,	6th Grade Reading,	12th Grade Reading,
Average Years of Education of Residents	- .19154 (.25710)	- .00408 (.20550)	.56045 (.21580)	1.33760 (0.28500)	.51246 (.20500)
Median Income of Families	.12707 (.07570)	- .01758 (.06050)	- .01226 (.06360)	- .34400 (.08340)	- .01854 (.05880)
Proportion of Residents With College Degrees	14.54700 (3.34200)	11.46400 (2.66600)	3.15480 (2.80400)	8.10390 (3.69600)	13.19200 (2.40400)
Proportion of Children Below Poverty Line	- 4.61020 (2.14700)	- 7.48390 (1.71400)	- 5.87060 (1.80600)	- 3.08080 (2.40100)	.85390 (1.77200)
Proportion Residents in Professional Occupations	1.25980 (2.93900)	4.80250 (2.34300)	.89616 (2.46400)	9.30450 (3.22900)	.69840 (2.08400)
Median Value of Owner Occupied Housing	.08217 (.02860)	.07840 (.02280)	.05365 (.02400)	.18828 (.03140)	.00381 (.02060)
Proportion Spanish Students	- 4.51430 (0.83350)	- 5.24540 (0.66690)	- 5.77920 (0.70020)	- 12.73900 (0.92500)	- 4.39330 (0.66190)
Proportion Black Students	- 3.77990 (1.17300)	- 5.24540 (0.93470)	- 7.67080 (0.98570)	- 22.22600 (1.28800)	- 9.49950 (0.82870)
Constant	23.17000 (2.78000)	25.94000 (2.23000)	31.64000 (2.34000)	44.53000 (3.10000)	14.42000 (2.32000)
R^2	.33990	.48050	.49540	.64950	.55180
Sum of Squared Residuals	28620	18090	8955	33870	3298
Number of Observations	1796	1781	1198	1772	960
Years	1970/71-72/73	1970/71-72/73	1971/72-72/73	1970/71-72/73	1970/71-72/73

Table 3A. Mathematics Test Predictions, Absolute Scores.

Independent Variables	Dependent Variable					
	6th Grade Math, Absolute	12th Grade Math, Absolute	6th Grade Math, Absolute	12th Grade Math, Absolute	6th Grade Math, Absolute	12th Grade Ma Absolute
Average Years of Education of Residents	2.73400 (0.17150)	1.09530 (0.06020)	1.80000 (0.31150)	.58963 (.11050)	2.00760 (0.23130)	.74790 (.07680)
Median Income of Families	.43960 (.07520)	.09930 (.02660)	.20400 (.09023)	- .00490 (.03150)	.29370 (.08110)	.02620 (.02800)
Proportion of Residents with College Degrees	--- ---	--- ---	18.59400 (3.79200)	10.30100 (1.27400)	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	- 8.89640 (4.62800)	- 2.96900 (1.76200)	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	14.54000 (3.12600)	7.21110 (1.02800)
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	35.11000 (1.39000)	- .45700 (.49700)	46.55000 (3.68000)	5.28400 (1.34000)	41.11000 (1.89000)	2.38300 (0.63200)
R^2	.38590	.52330	.39440	.56030	.39330	.54670
Sum of Squared Residuals	59130	1794	58310	1655	58420	1706
Number of Observations	1778	961	1778	961	1778	961
Years	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73

Table 38. Mathematics Test Predictions, Absolute Scores.

Independent Variables	Dependent Variable					
	6th Grade Math, Absolute	12th Grade Math, Absolute	6th Grade Math, Absolute	12th Grade Math, Absolute	6th Grade Math, Absolute	12th Grade M Absolute
Average Years of Education of Residents	2.32460 (.18610)	1.03400 (0.06790)	2.25780 (0.22550)	.98240 (.08210)	.52390 (.37820)	- .02020 (.13600
Median Income of Families	.06900 (.10110)	.03260 (.03780)	.45590 (.07750)	.11250 (.02800)	- .09782 (.10270)	- .00788 (.03735
Proportion of Residents with College Degrees	--- ---	--- ---	--- ---	--- ---	20.08500 (4.59300)	14.62300 (1.58700
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	- .70982 (4.44500)	- 3.02540 (1.67700
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	1.54320 (3.97200)	- .74280 (1.37700
Median Value of Owner Occupied Housing	.20540 (.03780)	.03460 (.01380)	--- ---	--- ---	.21720 (.03880)	.02210 (.01358
Proportion Spanish Students	--- ---	--- ---	- 3.56450 (1.08800)	- .86200 (.41810)	- 7.44200 (1.14000)	- 3.17700 (0.43710
Proportion Black Students	--- ---	--- ---	- 18.09600 (1.52900)	- 4.16200 (0.55220)	- 20.58000 (1.54400)	- 5.22600 (0.52490
Constant	39.18000 (1.57000)	.19770 (.56000)	41.36000 (2.09000)	.93810 (.76700)	59.77000 (4.18000)	11.97000 (1.5[illegible]000
R^2	.39590	.52640	.43300	.55160	.46350	.61670
Sum of Squared Residuals	58160	1782	1773	1687	51650	1443
Number of Observations	1778	961	1778	961	1778	961
Years	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73

Table 4A. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Reading, Transformed
Average Years of Education of Residents	.11610 (.01030)	.15100 (.00900)	.18030 (.01200)	.23270 (.00820)	.13300 (.00720)
Median Income of Families	.03310 (.00450)	.02160 (.00390)	.01390 (.00530)	.00710 (.00360)	- .00016 (.00320)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	- 1.66500 (0.08300)	- 1.65500 (0.07240)	- 1.00200 (0.09700)	- 1.75300 (0.06640)	- 1.91400 (0.05960)
R^2	.30800	.39510	.38760	.56440	.45310
Sum of Squared Residuals	215.2	163.2	130.8	133.3	25.81
Number of Observations	1796	1790	1198	1722	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 4B. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Reading Transformed
Average Years of Education of Residents	.04730 (.01850)	.09560 (.01620)	.13720 (.02180)	.19200 (.01510)	.09980 (.01370)
Median Income of Families	.01740 (.00540)	.00970 (.00470)	.00872 (.00630)	- .00230 (.00430)	- .00696 (.00389)
Proportion of Residents With College Degrees	1.18100 (0.22640)	.87680 (.19820)	.25870 (.26580)	.72940 (.18250)	.64820 (.15770)
Proportion of Families Below Poverty Line	- .82710 (.27600)	- .73080 (.24130)	- .94120 (.32360)	- .45030 (.22410)	- .23240 (.21860)
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	- .80100 (.21900)	- .95250 (.19100)	- .41110 (.25700)	- 1.24800 (0.17800)	- 1.53100 (0.16600)
R^2	.31830	.40190	.39220	.56830	.46420
Sum of Squared Residuals	211.9	161.4	129.8	132.1	25.29
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 4C. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Re Transformed
Average Years of Education of Residents	.08200 (.01390)	.11852 (.01210)	.17298 (.01630)	.18650 (.01100)	.10370 (.00930
Median Income of Families	.02620 (.00490)	.01500 (.00430)	.01250 (.00570)	- .00212 (.00385)	- .00630 (.00347
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	.68499 (.18760)	.65110 (.16410)	.14706 (.21990)	.92286 (.14820)	.60760 (.12510
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	- 1.38300 (0.11300)	- 1.38700 (0.09880)	- .94180 (.13300)	- 1.37200 (0.08980)	- 1.67500 (0.07680
R^2	.31310	.40040	.38780	.57370	.46620
Sum of Squared Residuals	213.6	161.8	130.7	130.4	25.19
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/7

Table 4D. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Readin Transformed
Average Years of Education of Residents	.10130 (.01120)	.14060 (.00977)	.17830 (.01310)	.21600 (.00890)	.13310 (.00780)
Median Income of Families	.01950 (.00610)	.01197 (.00530)	.01206 (.00713)	- .00793 (.00482)	- .00001 (.00455)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	.00750 (.00230)	.00529 (.00198)	.00104 (.00266)	.00835 (.00180)	- .00008 (.00170)
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---
Constant	- 1.51700 (0.09410)	- 1.55100 (0.08220)	- .98190 (.11000)	- 1.58600 (0.07520)	- 1.91600 (0.06750)
R^2	.31220	.39760	.38770	.56960	.45310
Sum of Squared Residuals	213.8	162.5	130.7	131.7	25.81
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 4E. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Readi Transformed
Average Years of Education of Residents	.08460 (.01400)	.10770 (.01200)	.10596 (.01570)	.15970 (.01020)	.10950 (.00960)
Median Income of Families	.03770 (.00480)	.02730 (.00416)	.02400 (.00540)	.01580 (.00350)	.00290 (.00326)
Proportion of Residents With College Degrees	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	--- ---
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---
Proportion Spanish Students	- .22440 (.06690)	- .31110 (.05781)	- .53320 (.07540)	- .53250 (.04930)	- .17740 (.04870)
Proportion Black Students	- .22380 (.09490)	- .52060 (.08171)	- .85020 (.10690)	- 1.11000 (0.06900)	- .67840 (.06434)
Constant	- 1.31900 (0.12900)	- 1.16800 (0.11100)	- .16970 (.14500)	- .91340 (.09420)	- 1.63400 (0.08940)
R^2	.31510	.41690	.43850	.63810	.51510
Sum of Squared Residuals	212.9	157.3	119.9	110.8	22.88
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 4F. Reading Test Predictions, Transformed Scores.

Independent Variables	Dependent Variables				
	1st Grade Reading, Transformed	2nd Grade Reading, Transformed	3rd Grade Reading, Transformed	6th Grade Reading, Transformed	12th Grade Reading Transformed
Average Years of Education of Residents	- .28380 (.02360)	.00714 (.02040)	.02910 (.02680)	.05280 (.01690)	.02877 (.01660)
Median Income of Families	.01090 (.00645)	.00376 (.00555)	.00495 (.00731)	- .01550 (.00460)	- .00536 (.00467)
Proportion of Residents With College Degrees	1.28670 (0.28820)	.99830 (.24820)	.67354 (.32700)	.86610 (.20520)	1.10080 (0.19290)
Proportion of Families Below Poverty Line	- .74630 (.27820)	- .56360 (.23940)	- .65040 (.31540)	- .04070 (.19990)	- .24860 (.20460)
Proportion Residents in Professional Occupations	.11640 (.24970)	.27910 (.21490)	.10048 (.28290)	.49950 (.17630)	.01910 (.16780)
Median Value of Owner Occupied Housing	.00715 (.00243)	.00630 (.00210)	.00613 (.00276)	.01164 (.00172)	.00041 (.00165)
Proportion Spanish Students	- .39190 (.07080)	- .45907 (.06110)	- .63087 (.08040)	- .73670 (.05050)	- .34970 (.05320)
Proportion Black Students	- .34370 (.09710)	- .58320 (.08350)	- .87190 (.11020)	- 1.23700 (.06850)	- .75300 (.06382)
Constant	- .01890 (.26100)	- .04910 (.22500)	.72520 (.29600)	.16730 (.18700)	- .76240 (.18800)
R^2	.33510	.43510	.44630	.66970	.54890
Sum of Squared Residuals	206.7	152.4	118.2	101.1	21.29
Number of Observations	1796	1790	1198	1772	960
Years	70/71-72/73	70/71-72/73	71/72-72/73	70/71-72/73	70/71-72/73

Table 5A. Mathematics Test Predictions, Transformed Scores.

Independent Variables	Dependent Variable					
	6th Grade Math, Transformed	12th Grade Math, Transformed	6th Grade Math, Transformed	12th Grade Math, Transformed	6th Grade Math, Transformed	12th Gr… Trans…
Average Years of Education of Residents	.12920 (.00840)	.14396 (.00776)	.07790 (.01510)	.07860 (.01440)	.08250 (.01130)	. (.
Median Income of Families	.02950 (.00368)	.01122 (.00344)	.01460 (.00438)	- .00215 (.00409)	.02010 (.00395)	. (.
Proportion of Residents with College Degrees	--- ---	--- ---	1.22420 (0.18430)	1.26310 (0.16540)	--- ---	
Proportion of Families Below Poverty Line	--- ---	--- ---	- .31240 (.22490)	- .47120 (.22880)	--- ---	
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	.93470 (.15230)	. (.
Median Value of Owner Occupied Housing	--- ---	--- ---	--- ---	--- ---	--- ---	
Proportion Spanish Students	--- ---	--- ---	--- ---	--- ---	--- ---	
Proportion Black Students	--- ---	--- ---	--- ---	--- ---	--- ---	
Constant	- .79400 (.06790)	- 2.18700 (0.06410)	- .18610 (.17900)	- 1.43000 (0.17400)	- .40870 (.09190)	- 1. (0.
R^2	.41700	.52230	.43350	.53390	.42910	.
Sum of Squared Residuals	141.7	28.87	137.7	27.89	138.7	28.
Number of Observations	1778	961	1778	961	1778	961
Years	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-

Table 5B. Mathematics Test Predictions, Transformed Scores.

Independent Variables	Dependent Variable					
	6th Grade Math, Transformed	12th Grade Math, Transformed	6th Grade Math, Transformed	12th Grade Math, Transformed	6th Grade Math, Transformed	12th Grade Ma Transforme
Average Years of Education of Residents	.10550 (.00908)	.13699 (.00840)	.10597 (.01109)	.12676 (.01060)	.00840 (.01830)	- .00077 (.01770)
Median Income of Families	.00802 (.00493)	.00358 (.00488)	.03050 (.00381)	.01340 (.00361)	- .00019 (.00497)	- .00240 (.00498)
Proportion of Residents with College Degrees	--- ---	--- ---	--- ---	--- ---	1.35420 (0.22250)	1.82200 (0.26620)
Proportion of Families Below Poverty Line	--- ---	--- ---	--- ---	--- ---	.08154 (.21530)	- .48020 (.21790)
Proportion Residents in Professional Occupations	--- ---	--- ---	--- ---	--- ---	.02044 (.19240)	- .09130 (.17880)
Median Value of Owner Occupied Housing	.01190 (.00184)	.00391 (.00178)	--- ---	--- ---	.01120 (.00188)	.00281 (.00176)
Proportion Spanish Students	--- ---	--- ---	- .17360 (.05350)	- .13040 (.05387)	- .40970 (.55030)	- .41330 (.05680)
Proportion Black Students	--- ---	--- ---	- .83430 (.07518)	- .54340 (.07115)	- .99960 (.07480)	- .67220 (.05679)
Constant	- .55800 (.07640)	- 2.11200 (0.07230)	- .49220 (.10300)	- 1.97900 (0.09280)	.54050 (.20200)	- .56050 (.20100)
R^2	.43040	.52470	.45690	.55190	.50110	.61050
Sum of Squared Residuals	138.4	29.72	132	28.02	121.2	24.35
Number of Observations	1778	961	1778	961	1778	961
Years	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73	70/71-72/73

Table 6. Correlation Matrix and Summary Statistics for Independent Variables[1]

	Education	Income	College	Poverty	Professional	Housing	Spanish	Black	Mean	Stand Devia
Elementary and Unified Districts										
Education	1.00								10.98	1.2
Income	0.78	1.00							9.97	2.9
College	0.82	0.80	1.00						.11	.0
Poverty	-0.83	-0.69	-0.53	1.00					.10	.0
Professional	0.88	0.80	0.91	-0.64	1.00				.24	.1
Housing	0.81	0.88	0.84	-0.65	0.83	1.00			20.06	8.2
Spanish	-0.69	-0.38	-0.39	0.60	-0.52	-0.37	1.00		.17	.1
Black	-0.08	-0.12	0.01	0.20	-0.07	-0.07	-0.00	1.00	.03	.0
Unified and Secondary Districts										
Education	1.00								11.03	1.1
Income	0.75	1.00							9.90	2.5
College	0.81	0.74	1.00						.11	.0
Poverty	-0.82	-0.73	-0.52	1.00					.10	.0
Professional	0.85	0.77	0.92	-0.59	1.00				.24	.0
Housing	0.78	0.88	0.80	-0.66	0.81	1.00			19.90	7.3
Spanish	-0.69	-0.34	-0.37	0.60	-0.47	-0.33	1.00		.15	.1
Black	-0.03	-0.05	0.04	0.09	-0.03	-0.00	-0.01	1.00	.04	.0

1. The poverty measure used in the table pertains to families; the one variable measuring the number of children from poverty families has not been included.

Appendix: Description of Tests

Grades 1, 2, 3: Reading

The Cooperative Primary Reading Tests, forms 12A, 23A, and 23B, which were selected for grades one, two, and three, survey the pupil's understanding of the basic concepts he needs for developing reading skills. They test his ability to comprehend as well as his skill to remember and to make comparisons. Each of the 50 items on each test requires the pupil to read a word, sentence, or paragraph and then mark a response from among three choices. The vocabulary of the test is geared to standard primary reading programs and most instructional materials.

Grade 6: Reading

The Comprehensive Tests of Basic Skills, Form Q, Level 2, was the battery selected for use in grade six. Eight subtests of this battery have been adopted for use in the state testing program. All items in the various subtests are of the multiple-choice type, with either four or five choices for each item.

Reading (Test 1, Reading Vocabulary; and Test 2, Reading Comprehension). The Reading Vocabulary test consists of 40 items which test the pupil's understandng of the meaning of underlined words presented in short statements. The pupil chooses, from among four alternatives, the word which has the closest meaning to the underlined word.

The Reading Comprehension test consists of 45 items designed to measure the pupil's ability to recognize stated details; to comprehend the ideas presented; to interpret by identifying main ideas, perceiving relationships, drawing conclusions, and making inferences; and to extend interpretations beyond the statements provided. The test uses articles, stories, poems, and letters as the bases for the test items.

Grade 6: Mathematics

Arithmetic (Test 6, Arithmetic Computation; Test 7, Arithmetic Concepts; and Test 8, Arithmetic Applications). The Arithmetic Computation test presents 48 items equally distributed among the four fundamental processes of addition, subtraction, multiplication, and division. They involve whole numbers, fractions, decimal fractions, and mixed numbers. The items are arranged to test each pupil in each process, regardless of his speed of performance.

The Arithmetic Concepts test consists of 30 items which measure the pupil's ability to recognize and/or apply appropriate concepts and techniques in order to demonstrate his comprehension of various numerical concepts and interrelationships. These items go beyond the four fundamental processes and explore concepts involved in measurement (money, time, length, volume, temperature), algebra, geometry, statistics, and logic.

The Arithmetic Applications test presents 20 items in which the emphasis is on problem solving. Word problems are presented to test the pupil's ability to comprehend the problem, to select an appropriate method for solving the problem, to reorganize the available facts, and to solve the problem by

arriving at a correct answer. The responses available to the pupil may not require him to solve the problem but may only ask him to indicate how he would solve it.

A total arithmetic computation score is obtained by adding the total number of correct responses gained on all three of these arithmetic tests, and only this total score is reported to the State Department of Education.

Grade 12: Reading and Mathematics

The Iowa Tests of Educational Development, Form X-4, Class Period Version, was selected for the statewide testing program in grade twelve.

Arithmetic (Test 4, Ability to Do Quantitative Thinking). This test presents 33 practical problem situations which most would agree high school graduates should be able to solve. Because of its concern with practical problems, the test has implications for the guidance of pupils regarding several curricular areas, particularly in the natural sciences and the social sciences. However, it also offers a measure of general aptitude for the study of mathematics. It covers basic computational skills involving whole numbers, fractions, and decimals; and the pupil's ability to apply those skills in problem-solving situations involving such concerns as volume, area, measurements, proportions, formulas, roots and powers, cost and profits, and approximation. It involves the interpretation of linear interpolations, symbols, graphs, tables, and charts.

Reading (Test 5, Ability to Interpret Reading Materials in the Social Studies). This test assesses the student's ability to interpret and evaluate reading matter representative of textbooks, reference books, periodical articles, and newspaper items dealing with social problems and social studies in general. The student is not merely asked to assimilate the ideas presented, but he is also asked to comprehend the implications and interrelationships of the ideas and to evaluate the authors' approaches and handling of the topics.

Eight passages dealing with geography, sociology, contemporary social problems, economics, political science, and history are presented. They are loosely organized, with the most important thoughts often implied rather than stated explicitly. The 53 questions which accompany these passages frequently require the student to make qualitative, subjective judgments.